NiceZyme View of ENZYME: EC 4.2.3.4

Official Name

3-dehydroquinate synthase.

Alternative Name(s)

3-dehydroquinate synthetase.
5-dehydroquinate synthase.
5-dehydroquinic acid synthetase.
dehydroquinate synthase.
3-deoxy-arabino-heptulosonate-7-phosphate phosphate-lyase (cyclizing).

Reaction catalysed

```
    3-deoxy-arabino-heptulosonate 7-phosphate
<=>
    3-dehydroquinate
 +  phosphate
```

Cofactor(s)

Cobalt; NAD.

Comments

- The hydrogen atoms on C-7 of the substrate are retained on C-2 of the products.
- Formerly EC 4.6.1.3.

Cross-references

BRENDA	4.2.3.4
EMP/PUMA	4.2.3.4
WIT	4.2.3.4
KYOTO UNIVERSITY LIGAND CHEMICAL DATABASE	4.2.3.4
IUBMB Enzyme Nomenclature	4.2.3.4
MEDLINE	Find literature relating to 4.2.3.4
Swiss-Prot	Q9WYI3, ARKB_THEMA; P07547, ARO1_EMENI; Q12659, ARO1_PNECA; Q9P7R0, ARO1_SCHPO; P08566, ARO1_YEAST; Q9YEJ9, AROB_AERPE; Q8U9V0, AROB_AGRT5; Q8YVQ0, AROB_ANASP; P31102, AROB_BACSU; Q8YJN9, AROB_BRUME; P57604, AROB_BUCAI; Q8K939, AROB_BUCAP; P59487, AROB_BUCBP; Q9PNT2, AROB_CAMJE; Q9A434, AROB_CAUCR; Q9PK25, AROB_CHLMU; Q9Z6M3, AROB_CHLPN; O84374, AROB_CHLTR; Q97KM3, AROB_CLOAB; Q8XMJ3, AROB_CLOPE; Q9X5D2, AROB_CORGL; P96749, AROB_CORPS; Q8X824, AROB_ECO57; Q8FCV7, AROB_ECOL6; P07639, AROB_ECOLI; P43879, AROB_HAEIN; Q9ZMF2, AROB_HELPJ; P56081, AROB_HELPY; Q9CES8, AROB_LACLA; Q92A81, AROB_LISIN; Q8Y5X6, AROB_LISMO; Q9CCS4, AROB_MYCLE; P36919, AROB_MYCTU; O50468, AROB_NEIGO; Q9JVW5, AROB_NEIMA; Q9JY01, AROB_NEIMB; P57924, AROB_PASMU; P34002, AROB_PSEAE; Q9V1H9, AROB_PYRAB; Q8ZW80, AROB_PYRAE; Q8U0A8, AROB_PYRFU; Q8XV62, AROB_RALSO; Q98FY1, AROB_RHILO; Q92ME7, AROB_RHIME; Q8Z205, AROB_SALTI; P77980, AROB_SALTY; Q99U24, AROB_STAAM; Q8NWN4, AROB_STAAW; Q9KXQ6, AROB_STRCO; Q8K6M3, AROB_STRP3; Q8P036, AROB_STRP8; Q97Q56, AROB_STRPN; Q99YR3, AROB_STRPY; Q980I9, AROB_SULSO; Q96Y96, AROB_SULTO; P73997, AROB_SYNY3; Q9HLE3, AROB_THEAC; Q8RB14, AROB_THETN; Q978S6, AROB_THEVO; Q9KNV2, AROB_VIBCH; Q8PI87, AROB_XANAC; Q8P6X3, AROB_XANCP; Q9PDP5, AROB_XYLFA; Q8ZJF6, AROB_YERPE;

L1 ANSWER 42 OF 42 REGISTRY COPYRIGHT 2002 ACS
RN 37211-77-1 REGISTRY
CN Synthase, 5-dehydroquinate (9CI) (CA INDEX NAME)
OTHER NAMES:
CN **3-Dehydroquinate synthase**
CN 3-Dehydroquinate synthetase
CN 5-Dehydroquinate synthase
CN 5-Dehydroquinic acid synthetase
CN Dehydroquinate synthase
CN Dehydroquinate synthetase
CN E.C. 4.6.1.3
MF Unspecified
CI MAN
LC STN Files: AGRICOLA, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CAPLUS, CASREACT, CIN, EMBASE, TOXCENTER, USPATFULL

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
161 REFERENCES IN FILE CA (1967 TO DATE)
5 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
161 REFERENCES IN FILE CAPLUS (1967 TO DATE)

WEST Search History

DATE: Sunday, August 25, 2002

Set Name side by side	Query	Hit Count	Set Name result set
	DB=USPT,PGPB; PLUR=YES; OP=ADJ		
L10	L9 and l6	3	L10
L9	L8 and (glycine max or soybean)	5	L9
L8	L7 and (cdna or dna or nucleic acid or nucleotide or polynucleotide or host or vector)	29	L8
L7	3 dehydroquinate synthase or 3 dehydroquinate synthetase or dehydroquinate synthase or dehydroquinate synthetase	32	L7
L6	l5 or l4 or l3 or l2 or l1	15521	L6
L5	(((536/23.2)!.CCLS.))	4391	L5
L4	(((435/320.1)!.CCLS.))	12435	L4
L3	(((435/252.3)!.CCLS.))	5854	L3
L2	(((435/232)!.CCLS.))	350	L2
L1	((435/183)!.CCLS.)	1639	L1

END OF SEARCH HISTORY

WEST

Generate Collection | Print

Search Results - Record(s) 1 through 5 of 5 returned.

1. Document ID: US 20020032323 A1

L9: Entry 1 of 5 File: PGPB Mar 14, 2002

PGPUB-DOCUMENT-NUMBER: 20020032323
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020032323 A1

TITLE: STREPTOCOCCUS PNEUMONIAE POLYNUCLEOTIDES AND SEQUENCES

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

2. Document ID: US 20020023280 A1

L9: Entry 2 of 5 File: PGPB Feb 21, 2002

PGPUB-DOCUMENT-NUMBER: 20020023280
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020023280 A1

TITLE: Expressed sequences of arabidopsis thaliana

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

3. Document ID: US 6319696 B1

L9: Entry 3 of 5 File: USPT Nov 20, 2001

US-PAT-NO: 6319696
DOCUMENT-IDENTIFIER: US 6319696 B1

TITLE: Process for producing L-amino acids

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

4. Document ID: US 4980285 A

L9: Entry 4 of 5 File: USPT Dec 25, 1990

US-PAT-NO: 4980285
DOCUMENT-IDENTIFIER: US 4980285 A

TITLE: Method for producing L-amino acids

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

---

5. Document ID US 4681852 A

L9: Entry 5 of 5 File: USPT Jul 21, 1987

US-PAT-NO: 4681852
DOCUMENT-IDENTIFIER: US 4681852 A

TITLE: Novel microorganism and method

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

---

Generate Collection | Print

Terms	Documents
L8 and (glycine max or soybean)	5

Display Format: - Change Format

Previous Page Next Page

WEST

Generate Collection | Print

Search Results - Record(s) 1 through 3 of 3 returned.

1. Document ID: US 20020032323 A1

L10: Entry 1 of 3 File: PGPB Mar 14, 2002

PGPUB-DOCUMENT-NUMBER: 20020032323
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020032323 A1

TITLE: STREPTOCOCCUS PNEUMONIAE POLYNUCLEOTIDES AND SEQUENCES

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

2. Document ID: US 20020023280 A1

L10: Entry 2 of 3 File: PGPB Feb 21, 2002

PGPUB-DOCUMENT-NUMBER: 20020023280
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020023280 A1

TITLE: Expressed sequences of arabidopsis thaliana

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

3. Document ID: US 4980285 A

L10: Entry 3 of 3 File: USPT Dec 25, 1990

US-PAT-NO: 4980285
DOCUMENT-IDENTIFIER: US 4980285 A

TITLE: Method for producing L-amino acids

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

Generate Collection | Print

Terms	Documents
L9 and l6	3

Display Format: - Change Format

Previous Page Next Page

```
=> d his

     (FILE 'HOME' ENTERED AT 18:24:38 ON 25 AUG 2002)

     FILE 'REGISTRY' ENTERED AT 18:25:44 ON 25 AUG 2002
L1             1 S 3-DEHYDROQUINATE SYNTHASE/CN

     FILE 'HCAPLUS' ENTERED AT 18:25:50 ON 25 AUG 2002

     FILE 'REGISTRY' ENTERED AT 18:25:53 ON 25 AUG 2002
                SET SMARTSELECT ON
L2           SEL L1 1- CHEM :       8 TERMS
                SET SMARTSELECT OFF

     FILE 'HCAPLUS' ENTERED AT 18:25:53 ON 25 AUG 2002
L3           197 S L2
                E GLYCINE MAX/CT
                E E3+ALL
                E SOYBEAN (GLYCINE MAX)/CT
                E E3+ALL
L4             1 S L3 (L) (GLYCINE MAX OR SOYBEAN)
L5            25 S L3 (L) (CDNA OR DNA OR NUCLEIC ACID OR NUCLEOTIDE OR POLYNUCL
L6            17 S L5 AND PD<19980721
```

=> d ibib ab 1

L4 ANSWER 1 OF 1 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 2000:85010 HCAPLUS
DOCUMENT NUMBER: 132:103787
TITLE: Plant genes encoding 3-dehydroquinate synthases
INVENTOR(S): Cahoon, Rebecca E.; Kinney, Anthony John; Rafalski, J. Antoni; Rendina, Alan R.
PATENT ASSIGNEE(S): E.I. Du Pont De Nemours and Co., USA
SOURCE: PCT Int. Appl., 46 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000005387	A1	20000203	WO 1999-US16354	19990720
W: AE, AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
AU 9951139	A1	20000214	AU 1999-51139	19990720

PRIORITY APPLN. INFO.: US 1998-93611P P 19980731
WO 1999-US16354 W 19990720

AB This invention relates to an isolated cDNA fragments encoding a **3-dehydroquinate synthases** from corn, rice, **soybean**, and wheat, with similarity to the known enzyme sequence from Escherichia coli. The invention also relates to the construction of a chimeric gene encoding all or a portion of the **3-dehydroquinate synthase**, in sense or antisense orientation, wherein expression of the chimeric gene results in prodn. of altered levels of the **3-dehydroquinate synthase** in a transformed host cell. This enzyme should also be useful for high throughput screening of compds suitable for use as herbicides.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> d ibib ab 1-17

L6 ANSWER 1 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1998:457718 HCAPLUS
DOCUMENT NUMBER: 129:94526
TITLE: Removing the rate-limiting steps of the common pathway of aromatic amino acid synthesis by overexpression of genes for rate-limiting enzymes
INVENTOR(S): Frost, John W.; Snell, Kristi D.; Frost, Karen M.
PATENT ASSIGNEE(S): Purdue Research Foundation, USA
SOURCE: U.S., 49 pp., Cont.-in-part of U. S. Ser. No. 994,194, abandoned.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5776736	A	19980707	US 1994-257354	19940609 <--
CA 2148482	AA	19940707	CA 1993-2148482	19931209 <--
WO 9533843	A1	19951214	WO 1995-US7321	19950608 <--
RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 763127	A1	19970319	EP 1995-922268	19950608 <--
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE				

PRIORITY APPLN. INFO.: US 1992-994194 B2 19921221
US 1994-257354 A 19940609
WO 1995-US7321 W 19950608

AB A method of increasing throughput of metabolites through the chorismate pathway to increase yields of arom. amino acids from producer microorganisms is described. The method involves increasing the levels of expression of genes for enzymes that can be rate-limiting by introduction of expression cassettes for the genes. The enzymes of interest include: **3-dehydroquinate synthase**, shikimate kinase, EPSP synthase, chorismate synthase, transketolase and DAHP synthase. These genes are expressed at levels that lead to no enzyme of the pathway being rate-limiting. The producers may be stably transformed by integration of the transforming **DNA** into the chromosome.

L6 ANSWER 2 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1998:219633 HCAPLUS
DOCUMENT NUMBER: 128:280231
TITLE: The 3-dehydroquinate synthase of Staphylococcus aureus and its use as a target for antibiotics in the control of infections
INVENTOR(S): Black, Michael Terence; Burnham, Martin Karl R.; Hodgson, John Edward; Knowles, David J. Ch.; Nicholas, Richard Oakly; Pratt, Julie M.; Reichard, Raymond W.; Rosenberg, Martin; Ward, Judith M.; Lonetto, Michael A.; Warren, Patrick V.; Payne, David J.; Brown, James R.
PATENT ASSIGNEE(S): Smithkline Beecham Corp., USA; Smithkline Beecham PLC
SOURCE: Eur. Pat. Appl., 34 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 8
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 832978	A2	19980401	EP 1997-307425	19970923 <--
EP 832978	A3	19991124		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
JP 10191987	A2	19980728	JP 1997-299291	19970924

WO 9837918	A1	19980903	WO 1998-US4483	19980227
W: CA, JP, US				
RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 968293	A1	20000105	EP 1998-911515	19980227
R: BE, CH, DE, DK, FR, GB, IT, LI, NL				
JP 2001516211	T2	20010925	JP 1998-537966	19980227
US 6165462	A	20001226	US 1999-345603	19990629
US 6248576	B1	20010619	US 2000-493459	20000128
US 2002064848	A1	20020530	US 2001-805848	20010314
US 2002082234	A1	20020627	US 2001-939980	20010827

PRIORITY APPLN. INFO.:	US 1996-37030P	P	19960924
	US 1997-39209P	P	19970228
	US 1997-910505	A3	19970804
	US 1997-918249	A3	19970825
	US 1997-936165	A3	19970923
	WO 1998-US4483	W	19980227
	US 2000-493459	A3	20000128

AB A 3-dehydroquinate synthase of Staphylococcus aureus and the gene encoding it are characterized. The gene for the enzyme is strongly expressed during infection and as such it may be a useful target for the development of new antibiotics or as antigen in vaccines.

L6 ANSWER 3 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1998:126266 HCAPLUS
DOCUMENT NUMBER: 128:189202
TITLE: Genomic DNA sequences of Streptococcus pneumoniae strain 0100993, their predicted protein products, and their diagnostic and therapeutic uses
INVENTOR(S): Black, Michael Terence; Hodgson, John Edward; Knowles, David Justin Charles; Lonetto, Michael Arthur; Nicholas, Richard Oakley; Stodola, Robert King
PATENT ASSIGNEE(S): Smithkline Beecham Corporation, USA; Black, Michael Terence; Hodgson, John Edward; Knowles, David Justin Charles; Lonetto, Michael Arthur; Nicholas, Richard Oakley; Stodola, Robert King
SOURCE: PCT Int. Appl., 640 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 13
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9806734	A1	19980219	WO 1997-US14436	19970815 <--
W: JP, US				
RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 956289	A1	19991117	EP 1997-938354	19970815
R: BE, CH, DE, DK, FR, GB, IT, LI, NL				
JP 2000514308	T2	20001031	JP 1998-510078	19970815
US 6310193	B1	20011030	US 1997-940572	19970930
US 6165762	A	20001226	US 1997-958668	19971027
US 5932701	A	19990803	US 1997-978458	19971125
US 6284878	B1	20010904	US 1997-991023	19971215
US 6171835	B1	20010109	US 1999-385288	19990830
US 6348578	B1	20020219	US 1999-417511	19991014
US 2002091236	A1	20020711	US 2001-861345	20010518

PRIORITY APPLN. INFO.:	US 1996-24022P	P	19960816
	US 1997-37536P	P	19970210
	US 1997-889711	A2	19970708
	US 1997-911503	A2	19970815
	WO 1997-US14436	W	19970815
	US 1997-958668	A3	19971027
	US 1997-977555	A3	19971125
	US 1997-978454	A3	19971125

AB Newly identified polynucleotides, polypeptides encoded by such polynucleotides, the uses of such polynucleotides and polypeptides, as

well as the prodn. of such polynucleotides and polypeptides and recombinant host cells transformed with the polynucleotides, are provided. Thus, 322 DNA fragment sequences and 392 encoded protein sequences are provided that are expressed by Streptococcus pneumoniae strain 0100993 during infection. Because each DNA sequence contains an open reading frame (ORF) with appropriate initiation and termination codons, the encoded protein upon expression can be used as a target for the screening of antimicrobial drugs. This invention also relates to inhibiting the biosynthesis or action of such polynucleotides or polypeptides and to the use of such inhibitors in therapy.

L6 ANSWER 4 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1998:49863 HCAPLUS
DOCUMENT NUMBER: 128:138410
TITLE: Salmonella typhimurium aroB mutants are attenuated in BALB/c mice
AUTHOR(S): Gunel-Ozcan, Aysen; Brown, Katherine A.; Allen, Andrew G.; Maskell, Duncan J.
CORPORATE SOURCE: Department of Biochemistry, Imperial College of Science, Technology and Medicine, London, SW7 2AY, UK
SOURCE: Microbial Pathogenesis (**1997**), 23(5), 311-316
CODEN: MIPAEV; ISSN: 0882-4010
PUBLISHER: Academic Press Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The aroB gene of Salmonella typhimurium, encoding **dehydroquinate synthase**, has been cloned into pUC19 and the **DNA** sequence detd. The aroB gene was isolated from a cosmid gene bank by complementation of an Escherichia coli aroB mutant and screening by Southern blot anal. The **nucleotide** sequence of the S. typhimurium aroB gene revealed the presence of an open reading frame, encoding a protein of 362 amino acids with a calcd. mol. mass of 38696 Daltons. The amino acid sequence of S. typhimurium **dehydroquinate synthase** is nearly identical to the Escherichia coli homolog and shows high homol. with other aroB gene products from other organisms. Subsequently, a stable insertional mutation in aroB was introduced into the wild-type S. typhimurium C5 strain. This mutant was auxotrophic for arom. compds. Infection of BALB/c mice with this mutant demonstrated attenuation comparable to other S. typhimurium mutants unable to biosynthesize arom. amino acids.

L6 ANSWER 5 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1997:687089 HCAPLUS
DOCUMENT NUMBER: 128:84906
TITLE: Cloning and functional characterization of the genes encoding 3-dehydroquinate synthase (aroB) and tRNA-guanine transglycosylase (tgt) from Helicobacter pylori
AUTHOR(S): Bereswill, S.; Fassbinder, F.; Volzing, C.; Haas, R.; Reuter, K.; Fiener, R.; Kist, M.
CORPORATE SOURCE: Abteilung Mikrobiologie und Hygiene, Institut fur Medizinische Mikrobiologie, Hermann-Herder-Strasse 11, Freiburg, D-79104, Germany
SOURCE: Medical Microbiology and Immunology (**1997**), 186(2-3), 125-134
CODEN: MMIYAO; ISSN: 0300-8584
PUBLISHER: Springer
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The aroB gene from Helicobacter pylori strain P1 was cloned and further characterized by sequence anal. and by functional complementation of the aroB mutation in Escherichia coli. The aroB gene encodes the enzyme 3-dehydroquinate synthase which catalyzes one of the early steps in the shikimate pathway. This pathway, which creates arom. mols. from sugar precursors, is present in prokaryotes, fungi and plants but is absent from mammalian cells. The predicted amino acid sequence of the H. pylori aroB

gene product showed significant homol. (30 - 40 identity and 50 - 60 similarity) to 3-dehydroquinate synthases from various other prokaryotes and eukaryotes. The single gene on a plasmid was biol. active in E. coli. It suppressed the specific phenotype of aroB mutants by restoring the shikimate pathway-dependent synthesis of arom. amino acids and the prodn. of the siderophore enterobactin. Two other reading frames were found adjacent to the aroB gene. The first, designated as orf1, had no significant homol. to proteins and genes present in databases, whereas the second was found to share a significant degree of homol. with the tgt gene encoding tRNA-guanine transglycosylase from a variety of other bacteria (40 - 50 identity and 60 - 70 similarity). The function of the tgt gene was confirmed by heterologous complementation. The gene on a plasmid was shown to complement the queuosine biosynthesis defect in a genetically defined tgt- strain of E. coli. The presence of the aroB gene and the putative tgt homolog in unrelated H. pylori strains was confirmed by Southern blot hybridization and by polymerase chain reaction with specific primers.

L6 ANSWER 6 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1997:482757 HCAPLUS
DOCUMENT NUMBER: 127:233226
TITLE: Attenuation and vaccine potential of aroQ mutants of Corynebacterium pseudotuberculosis
AUTHOR(S): Simmons, Cameron P.; Hodgson, Adrian L. M.; Strugnell, Richard A.
CORPORATE SOURCE: CRC for Vaccine Technology and Department of Microbiology and Immunology, University of Melbourne, Parkville, 3052, Australia
SOURCE: Infection and Immunity (**1997**), 65(8), 3048-3056
CODEN: INFIBR; ISSN: 0019-9567
PUBLISHER: American Society for Microbiology
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Corynebacterium pseudotuberculosis, a gram-pos. intracellular bacterial pathogen, is the etiol. agent of the disease caseous lymphadenitis (CLA) in both sheep and goats. Attenuated mutants of C. pseudotuberculosis have the potential to act as novel live veterinary vaccine vectors. The authors have cloned and sequenced the aroB and aroQ genes from C. pseudotuberculosis C231. By allelic exchange, aroQ mutants of both C231, designated CS100, and a pld mutant strain TB521, designated CS200, were constructed. Infection of BALB/c mice indicated that introduction of the aroQ mutation into C231 and TB521 attenuated both strains. In sublethally infected BALB/c mice, both CS100 and CS200 were cleared from spleens and livers by day 8 postinfection. The in vivo persistence of these strains was increased when the intact aroQ gene was supplied on a plasmid in trans. Mice infected with TB521 harbored bacteria in organs at least till day 8 postinfection without ill effect. When used as a vaccine, only the max. tolerated dose of CS100 had the capacity to protect mice from homologous challenge. Vaccination with TB521 also elicited protective immunity, and this was assocd. with gamma interferon (IFN-.gamma.) prodn. from splenocytes stimulated 7 days postvaccination. The role of IFN-.gamma. in controlling primary infections with C. pseudotuberculosis was examd. in mice deficient for the IFN-.gamma. receptor (IFN-.gamma.R-/- mice). IFN-.gamma.R-/- mice cleared an infection with CS100 but were significantly more susceptible than control littermates to infection with C231 or TB521. These studies support an important role for IFN-.gamma. in control of primary C. pseudotuberculosis infections and indicate that aroQ mutants remain attenuated even in immunocompromised animals. This is the first report of an aroQ mutant of a bacterial pathogen, and the results may have implications for the construction of arom. mutants of Mycobacterium tuberculosis for use as vaccines.

L6 ANSWER 7 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1996:466209 HCAPLUS
DOCUMENT NUMBER: 125:159938
TITLE: Cloning of a **cDNA** encoding a **3**-

dehydroquinate synthase from a higher plant, and analysis of the organ-specific and elicitor-induced expression of the corresponding gene

AUTHOR(S): Bischoff, Markus; Roesler, Jens; Raesecke, Hanns-R.; Goerlach, Joern; Amrhein, Nikolaus; Schmid, Juerg

CORPORATE SOURCE: Inst. Plant Sci., Swiss Fed. Inst. Technol., Zurich, CH-8092, Switz.

SOURCE: Plant Molecular Biology (**1996**), 31(1), 69-76
CODEN: PMBIDB; ISSN: 0167-4412

PUBLISHER: Kluwer
DOCUMENT TYPE: Journal
LANGUAGE: English

AB **CDNA** clones for all enzymes of the prechorismate pathway of higher plants have previously been cloned, with the exception of the second enzyme of the pathway, **3-dehydroquinate synthase**. Here the authors describe the isolation of a **cDNA** encoding a **3-dehydroquinate synthase** from tomato which was identified by complementing a **3-dehydroquinate synthase**-deficient Escherichia coli strain with a tomato **cDNA** library. The deduced amino acid sequence contains a putative N-terminal plastid-specific transit peptide, and the sequence of the mature enzyme resembles those of the corresponding bacterial enzymes more than of the fungal enzymes. Sequence identity was even higher between the tomato and E. coli sequences than between the E. coli and other known bacterial sequences. The abundance of **3-dehydroquinate synthase** transcripts differ in the organs of tomato plants analyzed. In cultured tomato cells, the abundance of **3-dehydroquinate synthase** transcripts increased 9-fold within 4 to 5 h of elicitor treatment.

L6 ANSWER 8 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1996:76630 HCAPLUS
DOCUMENT NUMBER: 124:108964

TITLE: Deblocking the common pathway of aromatic amino acid synthesis

INVENTOR(S): Frost, John W.; Snell, Kristi D.; Frost, Karen M.

PATENT ASSIGNEE(S): Purdue Research Foundation, USA

SOURCE: PCT Int. Appl., 86 pp.
CODEN: PIXXD2

DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 3

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9533843	A1	19951214	WO 1995-US7321	19950608 <--
RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
US 5776736	A	19980707	US 1994-257354	19940609 <--
EP 763127	A1	19970319	EP 1995-922268	19950608 <--
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE				

PRIORITY APPLN. INFO.:
US 1994-257354 A 19940609
US 1992-994194 B2 19921221
WO 1995-US7321 W 19950608

AB Enhanced efficiency of prodn. of arom. compds. via the common pathway (the shikimate pathway) of a host cell is realized by increasing the expression of enzymes acting on substrate intermediates in identified rate-limiting reaction steps in the pathway. Prokaryotic cell transformants are described comprising exogenous **DNA** sequences encoding for the enzymes **3-dehydroquinate synthase**, shikimate kinase, 5-enolpyruvylshikimate 3-phosphate synthase, and chorismate synthase. These transformants can be further transformed with exogenous **DNA** sequences encoding transketolase and DAHP synthase. In an embodiment of the present invention, .gtoreq.1 of the **DNA** sequences encoding the enzyme species are incorporated into the genome of the transformant.

L6 ANSWER 9 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1992:627292 HCAPLUS
DOCUMENT NUMBER: 117:227292
TITLE: The Mycobacterium tuberculosis shikimate pathway genes: evolutionary relationship between biosynthetic and catabolic 3-dehydroquinases
AUTHOR(S): Garbe, Thomas; Servos, Spiros; Hawkins, Alastair; Dimitriadis, George; Young, Douglas; Dougan, Gordon; Charles, Ian
CORPORATE SOURCE: MRC Tuberc. Relat. Infect. Unit, RPMS, London, W12 0HS, UK
SOURCE: Mol. Gen. Genet. (**1991**), 228(3), 385-92
CODEN: MGGEAE; ISSN: 0026-8925
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The M. tuberculosis shikimate pathway genes designated aroB and aroQ encoding **3-dehydroquinate synthase** and 3-dehydroquinase, resp. were isolated by mol. cloning and their **nucleotide** sequences detd. The deduced **dehydroquinate synthase** amino acid sequence from M. tuberculosis showed high similarity to those of equiv. enzymes from prokaryotes and filamentous fungi. Surprisingly, the deduced M. tuberculosis 3-dehydroquinase amino acid sequence showed no similarity to other characterized prokaryotic biosynthetic 3-dehydroquinases (bDHQases). A high degree of similarity was obsd., however, to the fungal catabolic 3-dehydroquinases (cDHQases) which are active in the quinic acid utilization pathway and are isoenzymes of the fungal bDHQases. This finding indicates a common ancestral origin for genes encoding the catabolic dehydroquinases of fungi and the biosynthetic dehydroquinases present in some prokaryotes. Deletion of genes encoding shikimate pathway enzymes represents a possible approach to generation of rationally attenuated strains of M. tuberculosis for use as live vaccines.

L6 ANSWER 10 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1992:485720 HCAPLUS
DOCUMENT NUMBER: 117:85720
TITLE: Overproduction in Escherichia coli of the dehydroquinate synthase domain of the Aspergillus nidulans pentafunctional AROM protein
AUTHOR(S): Van den Hombergh, Johannes P. T. W.; Moore, Jonathan D.; Charles, Ian G.; Hawkins, Alastair R.
CORPORATE SOURCE: Med. Sch., Univ. Newcastle upon Tyne, NE2 4HH, UK
SOURCE: Biochem. J. (**1992**), 284(3), 861-7
CODEN: BIJOAK; ISSN: 0306-3275
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The pentafunctional AROM enzyme of A. nidulans is encoded by the complex aromA locus and catalyzes steps 2-6 in the synthesis of chorismate, the common precursor for the arom. amino acids and p-aminobenzoic acid. **DNA** sequences encoding the **3-dehydroquinate synthase** (DHQ synthase) and 3-dehydroquinase domains of the AROM enzyme were amplified with the inclusion of a translational stop codon at the C-terminus by polymerase chain reaction (PCR) technol. These amplified fragments of **DNA** were subcloned into prokaryotic expression vector pKK233-2 and expressed in E. coli. As a result, the DHQ synthase domain was overproduced in E. coli, forming 30% of total cell protein, and could be purified to >80% homogeneity by a simple 2-step protocol. The 3-dehydroquinase domain was produced at a specific activity 8-fold greater than the corresponding activity encoded by the aromA gene in A. nidulans. The qutB gene of A. nidulans encoding quinate dehydrogenase was similarly subjected to PCR amplification and expression in E. coli. The quinate dehydrogenase was not overproduced, but was active in E. coli as a shikimate dehydrogenase, as the presence of the qutB gene allowed the growth of an E. coli mutant strain lacking shikimate dehydrogenase on minimal medium lacking arom. amino acid supplementation.

L6 ANSWER 11 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1988:162349 HCAPLUS
DOCUMENT NUMBER: 108:162349
TITLE: Cloning of a gene cluster of aroB, aroE and aroL for aromatic amino acid biosynthesis in Brevibacterium lactofermentum, a glutamic acid-producing bacterium
AUTHOR(S): Matsui, Kazuhiko; Miwa, Kiyoshi; Sano, Konosuke
CORPORATE SOURCE: Cent. Res. Lab., Ajinomoto Co., Ltd., Kawasaki, 210, Japan
SOURCE: Agric. Biol. Chem. (**1988**), 52(2), 525-31
CODEN: ABCHA6; ISSN: 0002-1369
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The aroL gene, encoding shikimate kinase of B. lactofermentum, a coryneform glutamic acid-producing bacterium, was cloned. Recombinant plasmids contg. the aroL gene caused elevated levels of shikimate kinase synthesis in B. lactofermentum. In addn. to the aroL gene, the aroB, and aroE genes, (encoding **dehydroquinate synthase** and shikimate dehydrogenase, resp.) also exist on these recombinant plasmids. The aroL, aroB, and aroE genes of B. lactofermentum are located closely on the cloned **DNA** fragment, in that order. At least these aro genes form a cluster on the chromosome B. lactofermentum.

L6 ANSWER 12 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1987:571018 HCAPLUS
DOCUMENT NUMBER: 107:171018
TITLE: Complex pyridine nucleotide-dependent transformations
AUTHOR(S): Frey, Perry A.
CORPORATE SOURCE: Coll. Agric. Life Sci., Univ. Wisconsin, Madison, WI, USA
SOURCE: Coenzymes Cofactors (**1987**), 2(Pyridine Nucleotide Coenzymes, Pt. B), 461-511
CODEN: COECEG
DOCUMENT TYPE: Journal; General Review
LANGUAGE: English
AB A review with 117 refs., of enzymic reactions, such as epimerizations, aldol reactions, cyclizations, .alpha.,.beta.-elimination-addns., and decarboxylations, in which enzyme-bound pyridine **nucleotide** prosthetic groups play the role of transient dehydrogenating agents. UDP-galactose 4-epimerases, nucleoside diphosphate oxidoreductases, adenosylhomocysteine hydrolase, ornithine cyclase, **dehydroquinate synthase**, myo-inositol 1-phosphate synthase, and urocanase are among the enzymes discussed.

L6 ANSWER 13 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1986:455400 HCAPLUS
DOCUMENT NUMBER: 105:55400
TITLE: The complete amino acid sequence of 3-dehydroquinate synthase of Escherichia coli K12
AUTHOR(S): Millar, Gary; Coggins, John R.
CORPORATE SOURCE: Dep. Biochem., Univ. Glasgow, Glasgow, G12 8QQ, UK
SOURCE: FEBS Lett. (**1986**), 200(1), 11-17
CODEN: FEBLAL; ISSN: 0014-5793
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The complete amino acid sequence of the E. coli **3-dehydroquinate synthase** [**37211-77-1**] was detd. by a combined **nucleotide** and direct amino acid sequencing strategy. E. coli **3-Dehydroquinate synthase** is 362 amino acids long and has a calcd. mol. wt. of 38,880. Anal. of the aroB **nucleotide** sequence and its 5'- and 3'-flanking regions has identified the aroB promoter elements and a possible 3'-terminator site.

L6 ANSWER 14 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1981:116610 HCAPLUS
DOCUMENT NUMBER: 94:116610
TITLE: Properties and regulation of enzymes in the shikimate

pathway of Hansenula henricii
AUTHOR(S): Bode, R.; Binrbaum, D.
CORPORATE SOURCE: Sekt. Biol., Ernst-Moritz-Arndt-Univ., Greifswald, DDR-2200, Ger. Dem. Rep.
SOURCE: Biochem. Physiol. Pflanz. (**1981**), 176(4), 331-43
CODEN: BPPFA4; ISSN: 0015-3796
DOCUMENT TYPE: Journal
LANGUAGE: German
AB The following enzymes were isolated from the yeast H. henricii by means of (NH4)2SO4 fractionation, DEAE-Sephadex A-50 and Sepharose 6B column chromatog.: **3-dehydroquinate synthase**, 3-dehydroquinase-shikimate-NADP oxidoreductase complex, shikimate kinase, 5-enolpyruvyl shikimate-3-phosphate synthase, and quinate-**DNA** oxidoreductase. The approx. mol. wts. of these enzymes were estd. using gel filtration. Properties of the purified enzyme were studied. Kinetic parameters and regulation of activity of enzymes were similar to those found in higher plants and bacteria. Arom. amino acids do not regulate activity and level of the enzymes studied.

L6 ANSWER 15 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1978:2193 HCAPLUS
DOCUMENT NUMBER: 88:2193
TITLE: Alicyclic acid metabolism in plants. 10. Partial purification and some properties of 3-dehydroquinate synthase from Phaseolus mungo seedlings
AUTHOR(S): Yamamoto, Etsuo
CORPORATE SOURCE: Dep. Biol., Tokyo Metrop. Univ., Tokyo, Japan
SOURCE: Plant Cell Physiol. (**1977**), 18(5), 995-1007
CODEN: PCPHA5
DOCUMENT TYPE: Journal
LANGUAGE: English
AB **Dehydroquinate synthase** (I) from P. mungo seedlings was purified 120-fold by DE-23, hydroxylapatite, and Sephadex G-100 column chromatog. steps. The final prepn. was free of dehydroquinate dehydratase and NAD(P)H oxidase. I required Co2+ and NAD as cofactors. Co2+ could be replaced by Cu2+ at 0.1 mM, but Cu2+ at higher levels was inhibitory. None of the other metal ions tested activated I. Some activity was obsd. in the absence of added Co2+ and this activity was inhibited by EDTA but not by diethyldithiocarbamate, NaN3 or NaCN. Heavy metal ions, such as Ag+ and Hg2+, and p-chloromercuribenzoate strongly inhibited I. Of the pyridine **nucleotides** tested, only NAD was required for max. activity of I. In the absence of NAD, I retained 30-40% of the activity obtained with added NAD. The apparent Km value for 3-deoxy-D-arabino-heptulosonic acid 7-phosphate at pH 7.4 was .apprx.23 .mu.M. I activity appeared to be maximal at .apprx. pH 8.5. However, the characteristics of the enzyme were studied at pH 7.4, because of the lability of I under alk. conditions. An Arrhenius plot of the I reaction showed a break at .apprx.21.degree.; below this crit. temp. the activation energy increased.

L6 ANSWER 16 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1975:69639 HCAPLUS
DOCUMENT NUMBER: 82:69639
TITLE: Separability of enzymes of the common aromatic biosynthetic pathway in Mycobacterium phlei
AUTHOR(S): Yapo, A.; Catala, F.; Azerad, R.
CORPORATE SOURCE: Inst. Biochim., Univ. Paris XI, Orsay, Fr.
SOURCE: Biochimie (**1974**), 56(8), 1145-6
CODEN: BICMBE
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The addn. of 4-6 mg of protamine sulfate/mg protein caused no significant loss of 3-deoxy-D-arabino-heptulosonate 7-phosphate synthetase, **dehydroquinate synthetase**, dehydroquinase, dehydroshikimate reductase, shikimate kinase, or chlorismate mutase. After protamine sulfate was used for **nucleic acid** pptn., an elution profile of these enzymes in a cell-free ext. of M. phlei

was obtained. The separability of these enzymes catalyzing the 5 initial steps of the common pathway of arom. amino acid biosynthesis in bacteria showed that the pathway in M. phlei is similar to that in other bacteria.

L6 ANSWER 17 OF 17 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1968:10494 HCAPLUS
DOCUMENT NUMBER: 68:10494
TITLE: Aromatic amino acid biosynthesis. Gene-enzyme-relationships in Bacillus subtilis
AUTHOR(S): Nasser, Delill S.; Nester, Eugene W.
CORPORATE SOURCE: Univ. of Washington, Seattle, Wash., USA
SOURCE: J. Bacteriol. (**1967**), 94(5), 1706-14
CODEN: JOBAAY
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Single step mutants of B. subtilis which required either 1 or all of the aromatic amino acids for growth were isolated. The relevant gene defect was detd. for each mutant by enzyme assays in vitro. A mutant deficient in each enzyme step of aromatic amino acid biosynthesis was found, with the exceptions of the shikimate kinase and the phenylalanine and tyrosine transaminases. Representative mutants carrying the defective genes were mapped by **DNA**-mediated transformation by reference to the aromatic amino acid gene (aro) cluster and, alternately, to any of the other unlinked aro genes. The genes coding for **dehydroquinate synthetase**, 3-enol pyruvyl-shikimate 5-phosphate synthetase, 1 form of chorismate mutase, and prephenate dehydrogenase are linked to the aro cluster. Except for the previously identified linkage between the genes of 3-deoxy-D-arabino-heptulosonic acid 7-phosphate synthetase and 1 species of chorismate mutase, the other genes involved in this pathway are neither linked to the aro cluster nor to each other. 48 references.